

REMARKS

## OVERVIEW

The Examiner informs Applicants that the text of those sections of Title 35, U.S. Code not included in this action could be found in a prior Office Action.

Applicants acknowledge with appreciation that the rejections of claims 1-10, 18, 21, 22, and 26-36 under 35 U.S.C. § 112, second paragraph have been withdrawn.

Non-elected claims 11-17 are cancelled without prejudice. Applicants reserve the right to file continuation applications with regard to the cancelled claims.

The Examiner points out that the priority amendments in the specification lack statements regarding the relationship between the instant application and the prior non-provisional application, and the specific status of the prior non-provisional application. Applicants have amended the specification to address these concerns. The instant application is a Continuation Application of Application Serial No. 09/208,349 filed on December 9, 1998, which is now abandoned.

## CLAIM REJECTIONS UNDER 35 U.S.C. § 112, SECOND PARAGRAPH

The Examiner rejects or maintains rejections to claims 18-21, 23-35, and 34-36 under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicants regard as the invention. The Examiner states that the arguments made by Applicants in the February 6, 2004 papers are not persuasive.

With regard to claim 19, the Examiner determines that the recitation, "A recombination construct comprising a DNA molecule which is part of a vector", is unclear if the claim is directed to a vector or a recombination construct comprising a DNA molecule. The Examiner

suggests wording to further clarify the instant claim. Indeed, Applicants intend to claim a vector and have amended claim 19 per the Examiner's suggestion. The Examiner's advice on improving the claim language is hereby acknowledged and thanked.

With regard to claims 18, 19, 20, and 24, the Examiner contends that the recitation, "agronomically significant gene," is not clear as to what other genes could be considered as "agronomically significant genes" besides those recited in the specification. Applicants have omitted the limitation "agronomically significant" when referring to a gene in the above claims to eliminate any confusion the omitted phrase may have caused.

With regard to claim 36, the Examiner states that the recitation, "wherein the recombination construct further comprises a transposon," is unclear. The Examiner suggests that it is unclear if the transposon is supposed to be the same as, or in addition to, the Ds element in the recombination construct of the method of claim 2. Applicants have amended claim 36 to clarify the confusion. The revised claim 36 now recites, "The method of claim 1 wherein the recombination construct comprises a transposon and direct repeats proximal to the transposon," should help to alleviate the confusion the original claim may have created.

#### CLAIM REJECTIONS UNDER 35 U.S.C. § 112, FIRST PARAGRAPH

The Examiner rejects claims 8-10 for failing to comply with the enablement requirement. The bases for this rejection cited by the Examiner are that the instant specification does not teach homologous recombination occurring in sequences within the Ds element after the Ds element excises from the DNA molecule where it resided, and the situation of the Ds element within the direct repeats. The Examiner, however, acknowledges that the specification teaches homologous recombination occurring between the direct repeats as a result of the Ds excision. Applicants

have amended claim 8 so as to address the Examiner's concerns. The amended claim 8 clearly states that the homologous recombination occurs between the direct repeats, and not between sequences within the Ds element. Further, the revised claim 8 clarifies that the Ds element is situated in between the direct repeats which undergo homologous recombination upon excision of the Ds element. Applicants submit that the amended claim complies with 35 U.S.C. § 112 as the Examiner agrees that the specification teaches homologous recombination occurring between the direct repeats as a result of the Ds excision.

#### CLAIM REJECTIONS UNDER 35 U.S.C. § 102

The Examiner maintains rejection of claim 1 under 35 U.S.C. § 102(a) as being anticipated by Shalev et al. (Genetics, July 1997, vol. 146, pages 1143-1151). Further, the Examiner deems Applicants' arguments in the previous communication as non-persuasive when applied to the current rejection.

Without conceding to the anticipation objection made by the Examiner, Applicants have amended claim 1 to further clarify the scope of the instant invention. Applicants are also presenting herein a 131 declaration to antidate the Shalev reference. As is established by the declaration and supporting data, Applicants conceived prior to July 1997 and coupled with due diligence, reduced to practice in November 1997. In the event that the declaration is not deemed sufficient, Applicant urges the following. The amended claim is directed to a method of inducing homologous recombination between nucleotide sequences having homologous regions within a recombination construct within a plant, wherein said recombination construct comprises a transposon flanked by said nucleotide sequences. The homologous recombination is effected by introducing the recombination construct into a plant and expressing a transposase within the

plant. It should be noted that the homologous recombination upon the excision of the transposon is between the nucleotide sequences resided within the recombination construct. The transposon can be a maize Ds element and the transposase one of maize origin. Because the instant invention teaches a method to induce homologous recombination between sequences within a recombination construct, it is patentably different from the homologous recombination as taught by Shalev and Levy, which requires the recombination partners located at ectopic locations, i.e., different chromosomes (see paragraph bridging pages 1145 and 1146). Claim 1 has been amended to illustrate that the recombination occurs within the construct.

The cited reference discloses a method of restoring  $\beta$ -Glucuronidase (GUS) activity upon recombination between two homologous ectopic (non-allelic) sequences in transgenic tobacco plants. One of the recombination partners carried a deletion at the 5'-end of GUS and an Ac or a Ds element inserted at the deletion site. The other partner carried an intact 5'-end of the GUS open reading frame and had a deletion at the 3'-end of the gene. After the recombination partners were introduced into plants, they were found to be in non-allelic positions within the chromosomes, i.e., they were not in *cis* on the same molecule. Thus, the homologous recombination as taught by Shalev and Levy necessarily involves two non-allelic sequences, most likely two sequences located on different chromosomes. These two sequences, upon the excision of the Ac element, function as donor and template, respectively, to effect the homologous recombination. In contrast, the instant invention teaches a recombination construct comprising overlapping DNA sequences which flank a Ds element. The recombination partners are located on the same chromosome and exist in *cis* on the same molecule. Homologous recombination between the two sequences of the same allele is induced by the excision of Ds upon expression of a transposase. It is therefore evident that the current invention has elements

fundamentally different from those disclosed in the cited reference. Applicants submit that the anticipation rejection to claim 1 should be withdrawn in light of the amendment and the arguments set forth above.

#### CLAIM REJECTIONS UNDER 35 U.S.C. § 103

The Examiner rejects claims 1-10, 18-21, 23-36 under 35 U.S.C. § 103(a) as being unpatentable over Swoboda et al. (EMBO, 1994, vol. 13, pages 484-489) in view of Shalev et al. (Genetics, July 1997, vol. 146, pages 1143-1151), Holtorf et al. (Plant Mol. Biol., 1995, vol. 29, pages 637-646), Hain et al. (Nature, 1993, vol. 361, pages 153-156), and Fromm et al. (Biotechnology, 1990, vol. 8, pages 833-839). The Examiner deems the arguments made by Applicants in the paper filed February 6, 2004 as non-persuasive. As stated earlier, Applicants have antedated the Shalev reference.

Applicants respectfully traverse this rejection. The test under 35 U.S.C. § 103(a) is whether the differences between the prior art and the invention, as a whole, would have been obvious to one having ordinary skill in the art. *Ruiz v. A.B. Chance Co.*, 234 F.3d 654, 662 (Fed. Cir. 2000). The prior art must teach one of ordinary skill in the art to combine elements from the prior art in the manner combined by the inventor. *Crown Operations Int'l., Ltd. v. Solutia, Inc.*, 289 F.3d 1367, 1376 (Fed. Cir. 2002). Thus, obviousness can not be determined by a hindsight gathering of elements in order to "fit the parameters" of the invention. *ATD Corp. v. Lydall, Inc.*, 159 F.3d 534, 546 (Fed. Cir. 1998).

None of the individual references cited by the Examiner render Applicant's invention obvious to one skilled in the art. Moreover, even if the references are combined, they do not teach one of ordinary skill in the art to combine elements from the prior art in the manner

combined by the inventor. As noted by the Examiner in the Office Action dated October 16, 2002, Swoboda does not teach homologous recombination induced by a transposase, inducible promoters, disease resistant genes, or transgenic maize plants. Shalev and Levy teaches non-allelic homologous recombination induced by Ac excision. Additionally, Holtorf et al. only teaches heat shock promoters. Further, Hain et al. only teaches enhanced disease resistance against fungal infection in transgenic tobacco plants conferred by a grape stilbene synthase gene. None of these references, separate or combined, teach introducing into a plant a recombination construct comprising overlapping nucleotide sequences flanking a transposon, wherein said nucleotide sequences undergo homologous recombination upon excision of the transposon. To conclude that Swoboda et al. makes the present invention obvious in view of Shalev and Levy, Holtorf et al., Hain et al., and Fromm et al. is exactly the hindsight gathering of elements in order to "fit the parameters" of the invention, which is prohibited under *ATD Corp. v. Lydall, Inc.*, 159 F.3d 534, 546 (Fed. Cir. 1998). Applicants submit that the claims, in the amended form, are in condition for allowance and not obvious to one skilled in the art.

## CONCLUSION

The Examiner reiterates the rejection of claims 1-10, 18-21, and 23-36. However, in view of the amendments and the foregoing arguments, Applicants submit that these claims have overcome the objections that the Examiner set forth. Applicants respectfully request that the Examiner enter these amendments and arguments and proceed to allow the amended claims.

If it is felt that it would aid in prosecution, the Examiner is invited to contact the undersigned at the number indicated to discuss any outstanding issues.

This is a request under the provision of 37 CFR § 1.136(a) to extend the period for filing a response in the above-identified application for three months from November 13, 2004 to February 13, 2005. Applicant is a small entity; therefore, please charge Deposit Account number 26-0084 in the amount of \$510.00 for three months to cover the cost of the extension. Any deficiency or overpayment should be charged or credited to Deposit Account 26-0084.

Reconsideration and allowance is respectfully requested.

Respectfully submitted,



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